

REMARKS

This is in response to the Office Action dated May 13, 2008. Applicant has amended the application as set forth above. In specific, Claims 1 and 2 have been amended. All the features of the amended claims are fully supported by the originally filed application. Thus, the amendments do not add new matter to the application. Upon the entry of the amendments, claims 1-11 are pending in this application. Applicant respectfully requests the entry of the amendments and reconsideration of the application.

Discussion on Claim Rejection under 35 U.S.C. §112

The Examiner rejected Claim 2 under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. In response, Applicant has amended Claim 2 to clarify the location of a virtual line in terms of the supply port and the exhaust port based on the disclosure of Fig. 1. Applicant respectfully requests withdrawal of the rejection.

Claim Rejections under 35 U.S.C. §103

The Patent and Trademark Office has the burden under section 103 to establish a *prima facie* case of obviousness. In *re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-87 (Fed. Cir. 1984). To establish a *prima facie* case of obviousness, three basic criteria must be met: first, the prior art reference (or references when combined) must teach or suggest all the claim limitations; second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; finally, there must be a reasonable expectation of success. M.P.E.P. §2143.

The Examiner rejected Claims 1, 2, 4, 10, and 11 under 35 U.S.C. §103(a) as being unpatentable over Davis et al (US 2002/0144707) in view of Van Buskirk et al (US 5,741,363), Gadgil et al (US 2004/0129212) and Srivastava et al (US 6,761,796). In response, Applicant has amended Claim 1 to clarify the inventive points of the independent claim. Applicant respectfully requests withdrawal of the rejections.

Prima Facie Case of Obviousness Has Not Been Established for Claim 1

Claim 1 of the instant application is directed to a plasma rapid thermal process apparatus comprising a supply port. The supply port includes an inner tube and an outer tube. A first spray hole is formed around a side wall of a closed portion of the inner tube, and a second spray holes are formed on an end of the outer tube. The openings of the first and second spray holes are substantially perpendicular to each other, such that uniformity of pressure of the process gas can be obtained (See page 8, lines 7-14; Figs. 1 and 2).

Whereas, Davis discloses a plasma reactor including a nozzle (44) and an exhaust port (48). However, Applicants respectfully submits that the disposition of the nozzle and the exhaust port against a wafer on a pedestal (18) in the disclosure of Davis is distinctly different from that of the present invention.

In the present invention, the supply port 160 and the exhaust port 170 are provided at both ends of the chamber with a wafer being mounted in the chamber. That is, the process gas is emitted from the supply port 160, passes over and through the wafer, and then reaches the exhaust port (170) without any major changer of course.

The Examiner stated “the support port comprises an inner plug 67 (made from ceramic)... and a gas spray hole 66b being formed in the side wall of the outer tube 66... Davis et al. additionally teach that the outer tube can have showerhead configuration at the output end.” However, the inner plug 67 of Davis’s reactor cannot be compared to the inner tube of the present invention because the inner plug does not have any hole on its side wall.

Davis discloses the gas spray hole 66b formed in the side wall of the outer tube 66, as the Examiner pointed correctly (See Fig. 3; Paragraph [0034]). In the present invention, the first spray hole in the side wall of the inner tube and the second spray holes in an end of the outer tube work together with space formed between the inner and outer tube so as to form a process gas having uniformity of pressure (See page 8, lines 7-14 of the publication W0 2005/031844 of the present invention). However, Davis does not disclose the relative disposition of the inner and outer tubes along with the first and second spray holes thereon.

Van Buskirk discloses an interiorly partitioned vapor injector including a housing (10) having a side wall (16), front and rear walls (12, 14), and a baffle plate (18). The Examiner stated “Van Buskirk et al teach a gas supply port device comprising: an inner tube 24... an outer tube 16... the incoming gas is diverted sideways after contacting the baffle plate.” However, the

conduit (24) cannot be regarded as an inner tube of the present invention since: i) it does not inserted into the side wall (16); and ii) it does not have any spray hole on its side wall. Perhaps, the second vapor flow conduit (80) may be treated as one, but still it does not have any spray hole on its side wall, either. By the same token, the conduit (16) cannot be an outer tube of the invention. (See Figs. 5 and 6; col. 9, lines 24-60).

Meanwhile, the baffle plate of Van Buskirk diverts the incoming gas sideways, but when the incoming gas passes/escapes the baffle plate in a direction perpendicular to the baffle plate, which is same as the direction of the holes provided on the front wall (12). Right after the baffle plate, the process gas reaches the big space confined by the side wall (16), the baffle plate (18), and the front wall (12). As a result, the process gas does not have a confined space provided between the two tubes; the inner and outer tubes of the invention. This difference comes from the fact that Van Buskirk's injector does not include clearly separated inner and outer tubes, resulting to missing of two kinds of spray holes perpendicular to each other.

Therefore, combination of Davis and Van Buskirk does not teach or suggest the supply port of the present invention.

Gadgil discloses an apparatus with linear injectors arranged in diametrical direction of the substrate and injecting reactive gases or radicals sequentially onto the treated substrate surface with a relative motion between the injectors and the substrate. Figs. 5A-5C show configurations of two linear injector arrangements in the form of two tubes, one inside the other, with aligned outlet ports (See Abstract; page 6, Paragraph [0059], [0060]).

As shown in Figs. 1A and 1B of Gadgil, each of the linear injectors (42, 44) opens to the chamber directly. As the Examiner pointed out, the two tubes have a similar disposition as in the present invention, one inside the other, but the inner tube does not provide a closed end to blow out the process gas through the outlet ports (300a or 302a, the inner one of the two). Additionally, the outer tube has the outlet ports that open sideways as the inner tube does. That is, the flow distribution of active species in, between, and off the two tubes cannot teach that of the present invention.

Therefore, combination of Davis, Van Buskirk, and Gadgil still does not teach or suggest the supply port of the present invention.

Prima Facie Case of Obviousness Has Not Been Established for Claim 2

Srivastava et al. teach a microwave remote plasma apparatus for photo-resist stripping comprising a thermal source comprising a plurality of lamps 58. However, Srivastava does not remedy the deficiency of the combination of Davis, Van Buskirk, and Gadgil against the amended Claim 1 from which Claim 2 depends. Therefore, Srivastava does not teach or suggest Claim 2.

Prima Facie Case of Obviousness Has Not Been Established for Claims 10 and 11

Since Davis does not teach or suggest the amended Claim 1, the independent claim from which Claims 10 and 11, or remedy the deficiency of the combination of the above, they are not obvious over Davis or the combination of the above.

Claim 3 Rejected under 35 U.S.C. §103

The Examiner rejected claim 3 under 35 U.S.C. §103(a) as being unpatentable over Davis et al (US 2002/0144707) in view of Van Buskirk et al (US 5,741,363), Gadgil et al (US 2004/0129212), Srivastava et al (US 6,761,796), and further in view of Sojoto et al (US 2002/0015855). In response, Applicant has amended Claim 1 to clarify the inventive points of the independent claim. Since Sojoto does not teach or suggest the amended Claim 1, the independent claim from which Claim 3, or remedy the deficiency of the combination of the above, it is not obvious over Sojoto or the combination of the above. Applicant respectfully requests withdrawal of the rejection.

Claims 5-6 Rejected under 35 U.S.C. §103

The Examiner rejected claims 5 and 6 under 35 U.S.C. §103(a) as being unpatentable over Davis et al (US 2002/0144707) in view of Van Buskirk et al (US 5,741,363), Gadgil et al (US 2004/0129212), Srivastava et al (US 6,761,796), and further in view of Zheng et al (US 2003/0066486). In response, Applicant has amended Claim 1 to clarify the inventive points of the independent claim. Since Zheng does not teach or suggest the amended Claim 1, the independent claim on which Claims 5 and 6, or remedy the deficiency of the combination of the above, it is not obvious over Zheng or the combination of the above. Applicant respectfully requests withdrawal of the rejection.

Claim 7 Rejected under 35 U.S.C. §103

The Examiner rejected claim 7 under 35 U.S.C. §103(a) as being unpatentable over Davis et al (US 2002/0144707) in view of Van Buskirk et al (US 5.741.363), Gadgil et al (US 2004/0129212), Srivastava et al (US 6.761.796), and further in view of Mahawili (US 6,544,339). In response, Applicant has amended Claim 1 to clarify the inventive points of the independent claim. Since Mahawili does not teach or suggest the amended Claim 1, the independent claim on which Claim 7, or remedy the deficiency of the combination of the above, it is not obvious over Mahawili or the combination of the above. Applicant respectfully requests withdrawal of the rejection.

Claim 8 Rejected under 35 U.S.C. §103

The Examiner rejected claim 8 under 35 U.S.C. §103(a) as being unpatentable over Davis et al (US 2002/0144707) in view of Van Buskirk et al (US 5.741.363), Gadgil et al (US 2004/0129212), Srivastava et al (US 6,761,796), and further in view of Toyoda et al (US PG PUB 2001/0029112) and Sawayama et al (US 2003/0164225). In response, Applicant has amended Claim 1 to clarify the inventive points of the independent claim. Since Toyoda and Sawayama do not teach or suggest the amended Claim 1, the independent claim on which Claim 8, or remedy the deficiency of the combination of the above, it is not obvious over Toyoda and Sawayama or the combination of the above. Applicant respectfully requests withdrawal of the rejection.

Claim 9 Rejected under 35 U.S.C. §103

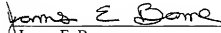
The Examiner rejected claim 9 under 35 U.S.C. §103(a) as being unpatentable over Davis et al (US 2002/0144707) in view of Van Buskirk et al (US 5.741.363), Gadgil et al (US 2004/0129212), Srivastava et al (US 6,761.796), and further in view of Tay et al (US 6,075,922). In response, Applicant has amended Claim 1 to clarify the inventive points of the independent claim. Since Tay does not teach or suggest the amended Claim 1, the independent claim on which Claim 7, or remedy the deficiency of the combination of the above, it is not obvious over Tay or the combination of the above. Applicant respectfully requests withdrawal of the rejection.

Conclusion

In view of the amendments and remarks made above, it is respectfully submitted that Claims 1-11 are in condition for allowance, and such action is respectfully solicited. If it is believed that a telephone conversation would expedite the prosecution of the present application, or clarify matters with regard to its allowance, the Examiner is invited to contact the undersigned attorney at the number listed below.

Respectively submitted,

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